



## SEQUENCE LISTING

&lt;110&gt; Squirrell, David

&lt;120&gt; Expression system

&lt;130&gt; 1498-139

&lt;140&gt; US 09/529,722

&lt;141&gt; 2000-04-19

&lt;160&gt; 5

&lt;170&gt; PatentIn version 3.3

&lt;210&gt; 1

&lt;211&gt; 550

&lt;212&gt; PRT

&lt;213&gt; Photinus pyralis

&lt;400&gt; 1

Met Glu Asp Ala Lys Asn Ile Lys Lys Gly Pro Ala Pro Phe Tyr Pro  
1 5 10 15

Leu Glu Asp Gly Thr Ala Gly Glu Gln Leu His Lys Ala Met Lys Arg  
20 25 30

Tyr Ala Leu Val Pro Gly Thr Ile Ala Phe Thr Asp Ala His Ile Glu  
35 40 45

Val Asn Ile Thr Tyr Ala Glu Tyr Phe Glu Met Ser Val Arg Leu Ala  
50 55 60

Glu Ala Met Lys Arg Tyr Gly Leu Asn Thr Asn His Arg Ile Val Val  
65 70 75 80

Cys Ser Glu Asn Ser Leu Gln Phe Phe Met Pro Val Leu Gly Ala Leu  
85 90 95

Phe Ile Gly Val Ala Val Ala Pro Ala Asn Asp Ile Tyr Asn Glu Arg  
100 105 110

Glu Leu Leu Asn Ser Met Asn Ile Ser Gln Pro Thr Val Val Phe Val  
115 120 125

Ser Lys Lys Gly Leu Gln Lys Ile Leu Asn Val Gln Lys Lys Leu Pro  
130 135 140

Ile Ile Gln Lys Ile Ile Met Asp Ser Lys Thr Asp Tyr Gln Gly  
145 150 155 160

Phe Gln Ser Met Tyr Thr Phe Val Thr Ser His Leu Pro Pro Gly Phe  
165 170 175

Asn Glu Tyr Asp Phe Val Pro Glu Ser Phe Asp Arg Asp Lys Thr Ile  
180 185 190

Ala Leu Ile Met Asn Ser Ser Gly Ser Thr Gly Leu Pro Lys Gly Val  
195 200 205

Ala Leu Pro His Arg Thr Ala Cys Val Arg Phe Ser His Ala Arg Asp  
210 215 220

Pro Ile Phe Gly Asn Gln Ile Ile Pro Asp Thr Ala Ile Leu Ser Val  
225 230 235 240

Val Pro Phe His His Gly Phe Gly Met Phe Thr Thr Leu Gly Tyr Leu  
245 250 255

Ile Cys Gly Phe Arg Val Val Leu Met Tyr Arg Phe Glu Glu Leu  
260 265 270

Phe Leu Arg Ser Leu Gln Asp Tyr Lys Ile Gln Ser Ala Leu Leu Val  
275 280 285

Pro Thr Leu Phe Ser Phe Phe Ala Lys Ser Thr Leu Ile Asp Lys Tyr  
290 295 300

Asp Leu Ser Asn Leu His Glu Ile Ala Ser Gly Gly Ala Pro Leu Ser  
305 310 315 320

Lys Glu Val Gly Glu Ala Val Ala Lys Arg Phe His Leu Pro Gly Ile  
325 330 335

Arg Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Ile Leu Ile Thr  
340 345 350

Pro Glu Gly Asp Asp Lys Pro Gly Ala Val Gly Lys Val Val Pro Phe  
355 360 365

Phe Glu Ala Lys Val Val Asp Leu Asp Thr Gly Lys Thr Leu Gly Val  
370 375 380

Asn Gln Arg Gly Glu Leu Cys Val Arg Gly Pro Met Ile Met Ser Gly  
385 390 395 400

Tyr Val Asn Asn Pro Glu Ala Thr Asn Ala Leu Ile Asp Lys Asp Gly  
405 410 415

Trp Leu His Ser Gly Asp Ile Ala Tyr Trp Asp Glu Asp Glu His Phe  
420 425 430

Phe Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln  
435 440 445

Val Ala Pro Ala Glu Leu Glu Ser Ile Leu Leu Gln His Pro Asn Ile  
450 455 460

Phe Asp Ala Gly Val Ala Gly Leu Pro Asp Asp Asp Ala Gly Glu Leu  
465 470 475 480

Pro Ala Ala Val Val Leu Glu His Gly Lys Thr Met Thr Glu Lys  
485 490 495

Glu Ile Val Asp Tyr Val Ala Ser Gln Val Thr Thr Ala Lys Lys Leu  
500 505 510

Arg Gly Gly Val Val Phe Val Asp Glu Val Pro Lys Gly Leu Thr Gly  
515 520 525

Lys Leu Asp Ala Arg Lys Ile Arg Glu Ile Leu Ile Lys Ala Lys Lys  
530 535 540

Gly Gly Lys Ser Lys Leu  
545 550

<210> 2  
<211> 548  
<212> PRT  
<213> Luciola cruciata

<400> 2

Met Glu Asn Met Glu Asn Asp Glu Asn Ile Val Val Gly Pro Lys Pro  
1 5 10 15

Phe Tyr Pro Ile Glu Glu Gly Ser Ala Gly Thr Gln Leu Arg Lys Tyr  
20 25 30

Met Glu Arg Tyr Ala Lys Leu Gly Ala Ile Ala Phe Thr Asn Ala Val  
35 40 45

Thr Gly Val Asp Tyr Ser Tyr Ala Glu Tyr Leu Glu Lys Ser Cys Cys  
50 55 60

Leu Gly Lys Ala Leu Gln Asn Tyr Gly Leu Val Val Asp Gly Arg Ile  
65 70 75 80

Ala Leu Cys Ser Glu Asn Cys Glu Glu Phe Phe Ile Pro Val Ile Ala  
85 90 95

Gly Leu Phe Ile Gly Val Gly Val Ala Pro Thr Asn Glu Ile Tyr Thr  
100 105 110

Leu Arg Glu Leu Val His Ser Leu Gly Ile Ser Lys Pro Thr Ile Val  
115 120 125

Phe Ser Ser Lys Lys Gly Leu Asp Lys Val Ile Thr Val Gln Lys Thr  
130 135 140

Val Thr Thr Ile Lys Thr Ile Val Ile Leu Asp Ser Lys Val Asp Tyr  
145 150 155 160

Arg Gly Tyr Gln Cys Leu Asp Thr Phe Ile Lys Arg Asn Thr Pro Pro  
165 170 175

Gly Phe Gln Ala Ser Ser Phe Lys Thr Val Glu Val Asp Arg Lys Glu  
180 185 190

Gln Val Ala Leu Ile Met Asn Ser Ser Gly Ser Thr Gly Leu Pro Lys  
195 200 205

Gly Val Gln Leu Thr His Glu Asn Thr Val Thr Arg Phe Ser His Ala  
210 215 220

Arg Asp Pro Ile Tyr Gly Asn Gln Val Ser Pro Gly Thr Ala Val Leu  
225 230 235 240

Thr Val Val Pro Phe His His Gly Phe Gly Met Phe Thr Thr Leu Gly  
245 250 255

Tyr Leu Ile Cys Gly Phe Arg Val Val Met Leu Thr Lys Phe Asp Glu  
260 265 270

Glu Thr Phe Leu Lys Thr Leu Gln Asp Tyr Lys Cys Thr Ser Val Ile  
275 280 285

Leu Val Pro Thr Leu Phe Ala Ile Leu Asn Lys Ser Glu Leu Leu Asn  
290 295 300

Lys Tyr Asp Leu Ser Asn Leu Val Glu Ile Ala Ser Gly Gly Ala Pro  
305 310 315 320

Leu Ser Lys Glu Val Gly Glu Ala Val Ala Arg Arg Phe Asn Leu Pro  
325 330 335

Gly Val Arg Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Ile Ile  
340 345 350

Ile Thr Pro Glu Gly Asp Asp Lys Pro Gly Ala Ser Gly Lys Val Val  
355 360 365

Pro Leu Phe Lys Ala Lys Val Ile Asp Leu Asp Thr Lys Lys Ser Leu  
370 375 380

Gly Pro Asn Arg Arg Gly Glu Val Cys Val Lys Gly Pro Met Leu Met  
385 390 395 400

Lys Gly Tyr Val Asn Asn Pro Glu Ala Thr Lys Glu Leu Ile Asp Glu  
405 410 415

Glu Gly Trp Leu His Thr Gly Asp Ile Gly Tyr Tyr Asp Glu Glu Lys  
420 425 430

His Phe Phe Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly  
435 440 445

Tyr Gln Val Pro Pro Ala Glu Leu Glu Ser Val Leu Leu Gln His Pro  
450 455 460

Ser Ile Phe Asp Ala Gly Val Ala Gly Val Pro Asp Pro Val Ala Gly  
465 470 475 480

Glu Leu Pro Gly Ala Val Val Val Leu Glu Ser Gly Lys Asn Met Thr  
485 490 495

Glu Lys Glu Val Met Asp Tyr Val Ala Ser Gln Val Ser Asn Ala Lys  
500 505 510

Arg Leu Arg Gly Gly Val Arg Phe Val Asp Glu Val Pro Lys Gly Leu  
515 520 525

Thr Gly Lys Ile Asp Gly Arg Ala Ile Arg Glu Ile Leu Lys Lys Pro  
530 535 540

Val Ala Lys Met  
545

<210> 3  
<211> 548  
<212> PRT  
<213> Luciola lateralis

<400> 3

Met Glu Asn Met Glu Asn Asp Glu Asn Ile Val Tyr Gly Pro Glu Pro  
1 5 10 15

Phe Tyr Pro Ile Glu Glu Gly Ser Ala Gly Ala Gln Leu Arg Lys Tyr  
20 25 30

Met Asp Arg Tyr Ala Lys Leu Gly Ala Ile Ala Phe Thr Asn Ala Leu  
35 40 45

Thr Gly Val Asp Tyr Thr Tyr Ala Glu Tyr Leu Glu Lys Ser Cys Cys  
50 55 60

Leu Gly Glu Ala Leu Lys Asn Tyr Gly Leu Val Val Asp Gly Arg Ile  
65 70 75 80

Ala Leu Cys Ser Glu Asn Cys Glu Glu Phe Phe Ile Pro Val Leu Ala  
85 90 95

Gly Leu Phe Ile Gly Val Gly Val Ala Pro Thr Asn Glu Ile Tyr Thr  
100 105 110

Leu Arg Glu Leu Val His Ser Leu Gly Ile Ser Lys Pro Thr Ile Val  
115 120 125

Phe Ser Ser Lys Lys Gly Leu Asp Lys Val Ile Thr Val Gln Lys Thr  
130 135 140

Val Thr Ala Ile Lys Thr Ile Val Ile Leu Asp Ser Lys Val Asp Tyr  
145 150 155 160

Arg Gly Tyr Gln Ser Met Asp Asn Phe Ile Lys Lys Asn Thr Pro Gln  
165 170 175

Gly Phe Lys Gly Ser Ser Phe Lys Thr Val Glu Val Asn Arg Lys Glu  
180 185 190

Gln Val Ala Leu Ile Met Asn Ser Ser Gly Ser Thr Gly Leu Pro Lys  
195 200 205

Gly Val Gln Leu Thr His Glu Asn Ala Val Thr Arg Phe Ser His Ala  
210 215 220

Arg Asp Pro Ile Tyr Gly Asn Gln Val Ser Pro Gly Thr Ala Ile Leu  
225 230 235 240

Thr Val Val Pro Phe His His Gly Phe Gly Met Phe Thr Thr Leu Gly  
245 250 255

Tyr Leu Thr Cys Gly Phe Arg Ile Val Met Leu Thr Lys Phe Asp Glu  
260 265 270

Glu Thr Phe Leu Lys Thr Leu Gln Asp Tyr Lys Cys Ser Ser Val Ile  
275 280 285

Leu Val Pro Thr Leu Phe Ala Ile Leu Asn Arg Ser Glu Leu Leu Asp  
290 295 300

Lys Tyr Asp Leu Ser Asn Leu Val Glu Ile Ala Ser Gly Gly Ala Pro  
305 310 315 320

Leu Ser Lys Glu Ile Gly Glu Ala Val Ala Arg Arg Phe Asn Leu Pro  
325 330 335

Gly Val Arg Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Ile Ile  
340 345 350

Ile Thr Pro Glu Gly Asp Asp Lys Pro Gly Ala Ser Gly Lys Val Val  
355 360 365

Pro Leu Phe Lys Ala Lys Val Ile Asp Leu Asp Thr Lys Lys Thr Leu  
370 375 380

Gly Pro Asn Arg Arg Gly Glu Val Cys Val Lys Gly Pro Met Leu Met  
385 390 395 400

Lys Gly Tyr Val Asp Asn Pro Glu Ala Thr Arg Glu Ile Ile Asp Glu  
405 410 415

Glu Gly Trp Leu His Thr Gly Asp Ile Gly Tyr Tyr Asp Glu Glu Lys  
420 425 430

His Phe Phe Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly  
435 440 445

Tyr Gln Val Pro Pro Ala Glu Leu Glu Ser Val Leu Leu Gln His Pro  
450 455 460

Asn Ile Phe Asp Ala Gly Val Ala Gly Val Pro Asp Pro Ile Ala Gly  
465 470 475 480

Glu Leu Pro Gly Ala Val Val Val Leu Glu Lys Gly Lys Ser Met Thr  
485 490 495

Glu Lys Glu Val Met Asp Tyr Val Ala Ser Gln Val Ser Asn Ala Lys  
500 505 510

Arg Leu Arg Gly Gly Val Arg Phe Val Asp Glu Val Pro Lys Gly Leu  
515 520 525

Thr Gly Lys Ile Asp Gly Lys Ala Ile Arg Glu Ile Leu Lys Lys Pro  
530 535 540

Val Ala Lys Met  
545

<210> 4  
<211> 548  
<212> PRT  
<213> Luciola mingrellica

<400> 4

Met Glu Met Glu Lys Glu Glu Asn Val Val Tyr Gly Pro Leu Pro Phe  
1 5 10 15

Tyr Pro Ile Glu Glu Gly Ser Ala Gly Ile Gln Leu His Lys Tyr Met  
20 25 30

His Gln Tyr Ala Lys Leu Gly Ala Ile Ala Phe Ser Asn Ala Leu Thr  
35 40 45

Gly Val Asp Ile Ser Tyr Gln Glu Tyr Phe Asp Ile Thr Cys Arg Leu  
50 55 60

Ala Glu Ala Met Lys Asn Phe Gly Met Lys Pro Glu Glu His Ile Ala  
65 70 75 80

Leu Cys Ser Glu Asn Cys Glu Glu Phe Phe Ile Pro Val Leu Ala Gly  
85 90 95

Leu Tyr Ile Gly Val Ala Val Ala Pro Thr Asn Glu Ile Tyr Thr Leu  
100 105 110

Arg Glu Leu Asn His Ser Leu Gly Ile Ala Gln Pro Thr Ile Val Phe  
115 120 125

Ser Ser Arg Lys Gly Leu Pro Lys Val Leu Glu Val Gln Lys Thr Val  
130 135 140

Thr Cys Ile Lys Lys Ile Val Ile Leu Asp Ser Lys Val Asn Phe Gly  
145 150 155 160

Gly His Asp Cys Met Glu Thr Phe Ile Lys Lys His Val Glu Leu Gly  
165 170 175

Phe Gln Pro Ser Ser Phe Val Pro Ile Asp Val Lys Asn Arg Lys Gln  
180 185 190

His Val Ala Leu Leu Met Asn Ser Ser Gly Ser Thr Gly Leu Pro Lys  
195 200 205

Gly Val Arg Ile Thr His Glu Gly Ala Val Thr Arg Phe Ser His Ala  
210 215 220

Lys Asp Pro Ile Tyr Gly Asn Gln Val Ser Pro Gly Thr Ala Ile Leu  
225 230 235 240

Thr Val Val Pro Phe His His Gly Phe Gly Met Phe Thr Thr Leu Gly  
245 250 255

Tyr Phe Ala Cys Gly Tyr Arg Val Val Met Leu Thr Lys Phe Asp Glu  
260 265 270

Glu Leu Phe Leu Arg Thr Leu Gln Asp Tyr Lys Cys Thr Ser Val Ile  
275 280 285

Leu Val Pro Thr Leu Phe Ala Ile Leu Asn Lys Ser Glu Leu Ile Asp  
290 295 300

Lys Phe Asp Leu Ser Asn Leu Thr Glu Ile Ala Ser Gly Gly Ala Pro  
305 310 315 320

Leu Ala Lys Glu Val Gly Glu Ala Val Ala Arg Arg Phe Asn Leu Pro  
325 330 335

Gly Val Arg Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Phe Ile  
340 345 350

Ile Thr Pro Glu Gly Asp Asp Lys Pro Gly Ala Ser Gly Lys Val Val  
355 360 365

Pro Leu Phe Lys Val Lys Val Ile Asp Leu Asp Thr Lys Lys Thr Leu  
370 375 380

Gly Val Asn Arg Arg Gly Glu Ile Cys Val Lys Gly Pro Ser Leu Met  
385 390 395 400

Leu Gly Tyr Ser Asn Asn Pro Glu Ala Thr Arg Glu Thr Ile Asp Glu  
405 410 415

Glu Gly Trp Leu His Thr Gly Asp Ile Gly Tyr Tyr Asp Glu Asp Glu  
420 425 430

His Phe Phe Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly  
435 440 445

Tyr Gln Val Pro Pro Ala Glu Leu Glu Ser Val Leu Leu Gln His Pro  
450 455 460

Asn Ile Phe Asp Ala Gly Val Ala Gly Val Pro Asp Pro Asp Ala Gly  
465 470 475 480

Glu Leu Pro Gly Ala Val Val Val Met Glu Lys Gly Lys Thr Met Thr  
485 490 495

Glu Lys Glu Ile Val Asp Tyr Val Asn Ser Gln Val Val Asn His Lys  
500 505 510

Arg Leu Arg Gly Gly Val Arg Phe Val Asp Glu Val Pro Lys Gly Leu  
515 520 525

Thr Gly Lys Ile Asp Ala Lys Val Ile Arg Glu Ile Leu Lys Lys Pro  
530 535 540

Gln Ala Lys Met  
545

<210> 5  
<211> 214  
<212> PRT  
<213> Escherichia coli

<400> 5

Met Arg Ile Ile Leu Leu Gly Ala Pro Gly Ala Gly Lys Gly Thr Gln  
1 5 10 15

Ala Gln Phe Ile Met Glu Lys Tyr Gly Ile Pro Gln Ile Ser Thr Gly  
20 25 30

Asp Met Leu Arg Ala Ala Val Lys Ser Gly Ser Glu Leu Gly Lys Gln  
35 40 45

Ala Lys Asp Ile Met Asp Ala Gly Lys Leu Val Thr Asp Glu Leu Val  
50 55 60

Ile Ala Leu Val Lys Glu Arg Ile Ala Gln Glu Asp Cys Arg Asn Gly

65

70

75

80

Phe Leu Leu Asp Gly Phe Pro Arg Thr Ile Pro Gln Ala Asp Ala Met  
85 90 95

Lys Glu Ala Gly Ile Asn Val Asp Tyr Val Leu Glu Phe Asp Val Pro  
100 105 110

Asp Glu Leu Ile Val Asp Arg Ile Val Gly Arg Arg Val His Ala Pro  
115 120 125

Ser Gly Arg Val Tyr His Val Lys Phe Asn Pro Pro Lys Val Glu Gly  
130 135 140

Lys Asp Asp Val Thr Gly Glu Glu Leu Thr Thr Arg Lys Asp Asp Gln  
145 150 155 160

Glu Glu Thr Val Arg Lys Arg Leu Val Glu Tyr His Gln Met Thr Ala  
165 170 175

Pro Leu Ile Gly Tyr Tyr Ser Lys Glu Ala Glu Ala Gly Asn Thr Lys  
180 185 190

Tyr Ala Lys Val Asp Gly Thr Lys Pro Val Ala Glu Val Arg Ala Asp  
195 200 205

Leu Glu Lys Ile Leu Gly  
210